HC

UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/824,512	04/02/2001	John S. Perry	1657.48US01	1115

24113   7590   04/23/2003

PATTERSON, THUENTE, SKAAR & CHRISTENSEN, P.A.
4800 IDS CENTER
80 SOUTH 8TH STREET
MINNEAPOLIS, MN 55402-2100

EXAMINER
SAADAT, CAMERON

ART UNIT	PAPER NUMBER
3713	

DATE MAILED: 04/23/2003

11
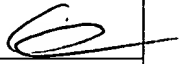
Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

P riod for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event. however. may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will. by statute. cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>2/3/03</u> .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*. 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-20</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-20</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

     If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All b)☐ Some * c)☐ None of:

         1.☐ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____ .

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

     a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)   4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)   5) ☐ Notice of Informal Patent Application (PTO-152)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .   6) ☐ Other: .

DETAILED ACTION

In response to the request for reconsideration filed 12/27/02 and supplemental

amendment filed 2/3/03, claims 1-20 are pending in this application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed
in the United States before the invention by the applicant for patent or (2) a patent granted on an application for
patent by another filed in the United States before the invention by the applicant for patent, except that an
international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this
subsection of an application filed in the United States only if the international application designated the United
States and was published under Article 21(2) of such treaty in the English language.

1.   **Claims 1, 3, 9-12, and 14-15 are rejected under 35 U.S.C. 102(e) as being anticipated**

by Provan et al. (USPN 6,208,955 B1; hereinafter Provan).

Regarding claim 1, Provan discloses an evaluation simulation system for a weapon

system (Col. 5, line 40), comprising: a computer system programmed to implement a causal

network model comprising a collection of analysis models including at least one dynamic

parameter (Col. 11, lines 57-67), for creating a virtual representation of a weapon system (Col. 6,

lines 42-51); at least one virtual simulation system coupled to a causal network model to

simulate a weapon system (See Fig. 6, refs. 602-610); a user interface coupled to at least said

computer system to selectively input data into said causal network model and receive

information from said causal network model and said virtual simulation system (Col. 6, lines 42-

44).

Regarding claim 3, Provan discloses an integrated evaluation simulation system for a

weapon system (Col. 5, line 40), wherein the computer system further comprises a control

system coupled to said causal network model to control operation of said causal network model in accordance with one of a plurality of modes of operation (Col. 11 lines 52- 67)

Regarding claim 9, Provan discloses an evaluation simulation system for a weapon system wherein the user interface has a menu driven graphical user interface (Col. 16, lines 32-35).

Regarding claim 10, Provan discloses an evaluation simulation system for a weapon system wherein said user interface visually displays a diagram of a causal network model having commonality with said causal network model (Col. 8, lines 23-27).

Regarding claim 11, Provan discloses an evaluation simulation system for a weapon system wherein the user interface displays data in a modular configuration of tables associated with one of a plurality of components or attributes of a weapon system (Col. 5, line 40; Col. 14, lines 59-65).

Referring to claim 12, Provan discloses an evaluation simulation system for a weapon system (Col. 5, line 40) wherein a causal network model communicates with a virtual simulation system via a series of data arrays (Col. 8, lines 44-52).

Regarding claim 14, Provan discloses an evaluation simulation system for a weapon system (Col. 5, line 40) wherein a causal network model includes a relational database to store data that define at least one interrelationship between a plurality of parameters of the causal network model or an operational performance and at least one parameter of the causal network model (Col. 6, lines 42-63).

Regarding claim 15, Provan discloses an evaluation simulation system for a weapon

system (Col. 5, line 40) wherein said causal network model has a modular implementation and

each module is represented by a separate subroutine (Col 6, lines 32-63).

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459

(1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating obviousness or nonobviousness.

4.   **Claims 2 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over**

Provan et al. (USPN 6,208,955 B1; hereinafter Provan) in view of Wingfield.

Regarding claim 2, Provan discloses an integrated evaluation simulation system for a

weapon system wherein the virtual simulation system comprises an operation simulator to

simulate operations of said weapon system. Provan does not explicitly disclose an effectiveness

simulator to evaluate the effectiveness of a weapon system in a simulated operational

environment. However, Wingfield discloses a simulation and evaluation system for determining

the effectiveness of a weapon system in a simulated operational environment (See ¶'s 6 and 10).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the weapon evaluation and simulation system described in Provan, by evaluating the effectiveness of a weapon system in a simulated operational environment, in light of the teachings of Wingfield, in order to determine the operational effectiveness of a plurality of weapon systems during a plurality of environmental conditions, and further providing analysis to determine which weapon systems are successful in passing the baseline criteria (See Wingfield ¶ 6).

Regarding Claim 13, Provan discloses that the files that represent the model should be certified to comply with governmental or manufacturer specifications (Col. 14, lines 59-67) for use in an aircraft. Provan does not specifically teach that the virtual simulation system is a *GroundWars* simulation model. However, Wingfield discloses models that simulate weapons utilized in ground wars (See ¶'s 6 and 10). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the certified model described in Provan, in order to determine the operational effectiveness of a plurality of weapon systems during a plurality of environmental conditions, and further providing analysis to determine which weapon systems are successful in passing the baseline criteria (See Wingfield ¶ 6).

5.   Claims 4-7, and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Provan et al. (USPN 6,208,955 B1; hereinafter Provan) in view of Wingfield, further in view of Allred.

Regarding claims 16-20, Provan discloses an evaluation simulation system for a weapon system (Col. 5, line 40), comprising: a computer system programmed to implement a causal network model comprising a collection of analysis models including at least one dynamic

parameter (Col. 11, lines 57-67), for creating a virtual representation of a weapon system (Col. 6, lines 42-51); at least one virtual simulation system coupled to a causal network model to simulate a weapon system (See Fig. 6, refs. 602-610); a user interface coupled to at least said computer system to selectively input data into said causal network model and receive information from said causal network model and said virtual simulation system (Col. 6, lines 42-44). Provan discloses all of the claimed subject matter, yet does not explicitly disclose a means to *optimize the effectiveness of a weapon system*. However, Wingfield discloses a simulation and evaluation system for determining the *effectiveness of a weapon system* in a simulated operational environment (See ¶'s 6 and 10). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the weapon evaluation and simulation system described in Provan, by evaluating the effectiveness of a weapon system in a simulated operational environment, in light of the teachings of Wingfield, in order to determine the operational effectiveness of a plurality of weapon systems during a plurality of environmental conditions, and further providing analysis to determine which weapon systems are successful in passing the baseline criteria set forth by Governmental standards (See Wingfield ¶ 6). Allred further teaches software, comprising tools to *optimize* coefficients of a weapon system (see Abstract). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to provide a an optimization mode to the weapon system effectiveness model described in the combination of Provan and Wingfield, in light of the teachings of Allred in order to enhance the accuracy of the weapon system operations.

Regarding claims 4 and 6, Provan discloses an evaluation simulation system for a weapon system wherein a control system selectively operates the causal network model in various modes

(Col. 11 lines 52- 67). Provan does not explicitly disclose a sensitivities mode (as per claim 4) or

an optimization mode (as per claims 4 and 6). However, Wingfield discloses a system for

modeling a weapon system wherein a sensitivities analysis is provided; and Allred further

teaches software comprising tools to optimize coefficients of a weapon system (see Abstract).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to

modify the modes of operation described in Provan, by providing a sensitivities analysis and an

optimization mode, in light of the teachings of Wingfield and Allred respectively, in order to

determine the threshold levels and effectiveness of a weapon system by varying parameters of a

weapon system, and further providing an optimization routine to enhance accuracy of the

weapon system.

Regarding claim 5, Provan discloses an integrated evaluation simulation system for a

weapon system wherein said causal network model performs failure analysis in a simulated

avionics system (col. 3, lines 18-40). Provan does not explicitly disclose a sensitivity analysis

between an operational performance of the weapon system and an operational performance of

one or more selected components or attributes of the weapon system. However, Westfield

discloses a sensitivities analysis wherein the operational performance of weapon system

guidance is analyzed during various types of GPS operations failure (¶ 15.9). In view of

Wingfield, at the time of the invention, it would have been obvious to a person of ordinary skill

in the art to modify the modes of operation described in Provan, by providing sensitivities

analysis between a the operational performance of a weapon system and a selected component of

the weapon system, in order to predict probability of error based on specific failure of weapon

system components.

Regarding claim 7, Neither Provan nor Wingfield disclose an optimization routine that

implements a *gradient search methodology* to optimize allocation of one or more selected

constrained resources or design of one or more selected components or attributes of said weapon

system. However, Allred teaches a software tool comprising a gradient search methodology to

optimize coefficients of a weapon system (See P. 360). At the time of the invention, in view of

Allred, it would have been obvious to a person of ordinary skill in the art to modify the mode of

operation described in the combination of Provan and Wingfield, by providing a gradient search

methodology to avoid the fatal flaw of instability which occurs during a non-linear approach of

providing an optimization routine.

6.   **Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Provan et al.**

(USPN 6,208,955 B1; hereinafter Provan) in view of Wingfield, further in view of Allred,

still further in view of Nakajima (U.S. Patent No. 6,411,945).

The combination of Provan, Wingfield, and Allred discloses an evaluation and simulation

system for a weapon system comprising an optimization routine directed towards cost vs.

performance (see Wingfield, ¶ 15.4), but does not specifically an optimization routine directed

towards cost and weight. However, it is the examiner's position that cost and weight are old and

well-known parameters used in optimization routines. Furthermore, Nakajima teaches an

optimization routine comprising cost and weight constraints (column 10, lines 29-35). Hence, in

view of Nakajima, it would have been obvious to one of ordinary skill in the art at the time of the

invention to modify the optimization routine described in the combination of Provan, Wingfield,

and Allred to provide cost and weight constraints, thereby minimizing the size and weight of

military equipment while maintaining a cost-effective product.

Response to Arguments

7.   Applicant's arguments with respect to claim 1-20 have been considered but are moot in

view of the new ground(s) of rejection. The extended prosecution of this application is

respectfully regretted.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure:

- Gaston – discloses a method of providing sensitivity analysis and
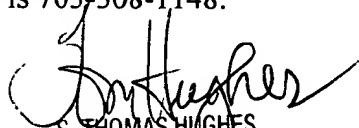 optimization.

9.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Cameron Saadat whose telephone number is 703-305-5490. The

examiner can normally be reached on M-F 8:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Valencia Martin Wallace can be reached on 703-308-4119. The fax phone numbers

for the organization where this application or proceeding is assigned are 703-872-9302 for

regular communications and 703-872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is 703-308-1148.

S. THOMAS HUGHES
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700

CS
April 14, 2003